PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Ernesto Lasalandra et al.
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Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF

Commissioner for Patents:

This brief is in response to the Final Rejection mailed October 16, 2008, the Advisory Action Mailed March 4, 2009, and the Advisory Action Mailed May 6, 2009, and in furtherance of the Notice of Appeal, filed in this case on April 16, 2009. The fees required under Section 41.20(b)(2), and any required request for extension of time for filing this brief and fees therefor, are dealt with in the accompanying transmittal letter.

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I. REAL PARTY IN INTEREST

The real party in interest is STMicroelectronics, which is the assignee of the present invention.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and assignee are unaware of any appeals or interferences which directly affect or will be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-24 and 28-31 are pending, and claims 25-27 and 32-33 are cancelled. The rejections of all pending claims are being appealed.

IV. STATUS OF AMENDMENTS

The Final Rejection was mailed October 16, 2008. An amendment in response to the Final Rejection was filed February 17, 2009, which was not entered. An Advisory Action was mailed March 4, 2009,[1] indicating, *entre alia*, non-entry of the previously filed amendment. a second response to the Final Rejection was filed with the Notice of Appeal on April 16, 2009, with an amendment placing the claims in better form for consideration on appeal. A second Advisory Action was mailed March 4, 2009,[2] indicating entry of the amendment of April 16, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Introduction

The summary that follows includes "a concise explanation of the subject matter defined in each of the independent claims involved in the appeal," with reference to the specification by page and line number, and Figure and reference number, as required under 37 C.F.R. § 41.37(c)(1)(v). Each independent claim and each claim that includes a means plus function limitation is listed at the end of this section, and subject matter in the specification

[1] Hereafter, *First Advisory Action.*

[2] Hereafter, *Second Advisory Action.*

corresponding to each claimed function is set forth by reference to page and line number and, where applicable, to Figure and reference number.

The principles of the invention are most easily understood in comparison to the prior art. Accordingly, aspects of the prior art will be reviewed prior to the discussion of the invention. The invention summary provides a general description of disclosed subject matter on which the claims read, without attempting to identify every element of every disclosed embodiment on which any limitation of any claim reads. Nor should it be relied upon to define the scope of the claims. Instead, representative elements are set forth with appropriate explanation to assist the Board in quickly acquiring an understanding of the subject matter, sufficient to follow the arguments set forth and to arrive at an informed decision.

B. Review of Aspects of the Prior Art

As portable battery powered electronic devices have become more and more common and widely used, extending the life of the batteries in such devices has become increasingly important. One known method for doing so is to place a device on standby if it is not moved for some selected period of time. While on standby, most of the systems of the device are shut down, such as, for example, hard drive, video screen, keypad, etc., which reduces battery draw. A detection circuit remains active, and includes an inertial sensor configured to detect movement of the device. Upon movement being detected, the detection circuit reactivates the device for normal operation. Thus, battery consumption is reduced without appreciably affecting operation of the device by the user **(10:8-20)**.[3]

Figure 1 of the specification is reproduced below as Figure 1 of the present brief. The Figure is a graph that shows the response of a typical linear inertial sensor and detection device that is sensitive to acceleration of the sensor in two axes, X and Y. For simplicity and clarity, acceleration in only two axes is shown and described, but operation in a third axis of acceleration is substantially identical to that described below with respect to two axes.

[3] For brevity, where sections or specific passages of the specification are cited, they will be indicated in bold by a page number separated from a line number by a colon, e.g., **4:22**, indicating page 4, line 22 of the specification.

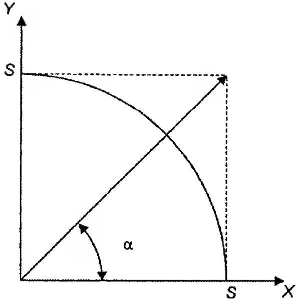

Figure 1
(Figure 1 of the specification)

Any acceleration along a vector that lies in the plane defined by the perpendicular axes X and Y includes an X and a Y component. A line on the graph at the appropriate angle represents the absolute value of a detected acceleration, with the length of the line corresponding to the amplitude, or strength, of the acceleration. The respective amplitudes of the X and Y components determine the angle and amplitude of the vector. In the example shown, the acceleration lies at a 45 degree angle, so the X and Y components are of equal strength, as shown by the dotted lines, which intersect the respective ordinals an equal distance from the zero point.

Typically, a device for reactivating a portable electronic device from standby functions exactly as represented in the graph of Figure 1. Namely, a first sensing element that is sensitive to acceleration along only one axis is positioned so that it will detect acceleration along the X axis, and a second identical sensing element is positioned at right angles to the first element, so that it will detect acceleration along the Y axis. When an acceleration occurs, signals from the sensing elements are compared to respective threshold values S to determine if a reactivation signal should be produced.

A problem associated with the sensing device represented by Figure 1 is that, while an acceleration of a magnitude S directly along one of the axes X or Y is sufficient to reactivate the device, the same magnitude of acceleration along a vector that does not correlate exactly with one of the axes X or Y may not be detected by the detection circuit because it does

not exceed the threshold of either axis. An ideal device configured would detect any acceleration that crossed the arced line of Figure 1, regardless of the vector. However, given the simple comparison arrangement discussed above, the acceleration must cross one of the dotted lines before it is detected. It can be seen that an acceleration along vector A, lying at 45 degrees, relative to the X and Y axes, must be significantly stronger than the value of S before it crosses a dotted line and is detected **(2:23-3:7)**. While it is possible to calculate the actual vector and amplitude of an acceleration from the signals of the two sensing elements, in order to accurately determine when the amplitude exceeds the threshold, regardless of the angle, the power requirements for such computations would increase battery draw to an unacceptable degree.

C. <u>Summary of Principles of the Invention</u>

Figure 4 of the specification is reproduced below as Figure 2 of the present brief.

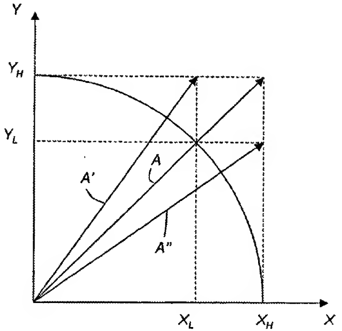

Figure 2
(Figure 4 of the specification)

Figure 2 is a graph showing the response of a linear inertial sensor and detection circuit according to a disclosed embodiment of the invention. As with the previously discussed circuit, the circuit represented by the graph of Figure 2 is sensitive to movement in either direction along two axes X and Y.

The sensing device represented by the graph of Figure 2 is configured to compare the X and Y signals to respective high (X_H, Y_H) and low (X_L, Y_L) thresholds, and to produce a reactivation signal if *either* the X or the Y signal exceeds its respective high threshold X_H, Y_H, or if both the X *and* the Y signals exceed their respective low thresholds X_L, Y_L **(9:1-9)**. In other words, if the vector line representing a sensed acceleration crosses either the line X_H or the line Y_H, the reactivation signal is produced, and the reactivation signal is also produced if the line crosses *both* of the lines X_L and Y_L. It can be seen that detection of acceleration along vector A will now be detected as it crosses the arc, and accelerations along vectors A' and A", which represent the vectors at which the greatest acceleration is required to trigger a reactivation signal, will do so at a significantly lower magnitude than along vector A using the circuit of Figure 1. In this way, the disparity between the nominal threshold value and the maximum value that may actually be required is reduced **(9:10-10:7)**.

Figure 3 of the specification is reproduced below as Figure 3.

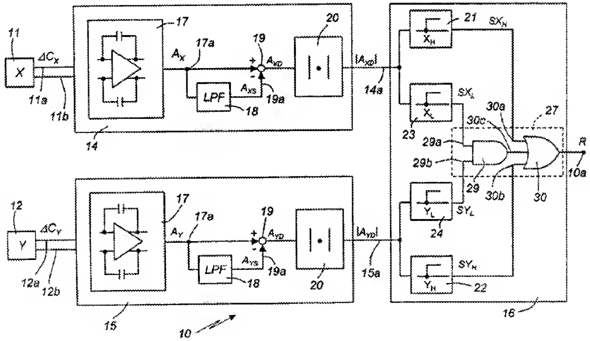

Figure 3
(Figure 3 of the specification)

Figure 3 is a block diagram of a inertial detection circuit 10, according to one embodiment, that is configured to operate substantially as described above with reference to Figure 2. The device 10 includes first and second inertial sensors 11, 12, first and second

transduction stages 14, 15, and a comparison stage 16 **(5:4-8)**. The detection circuit 10 is configured to produce a recognition signal R at an output 10a **(7:22)**.

Inertial sensors 11, 12 are arranged to detect accelerations of the device 10 along X and Y axes, respectively. In this embodiment, the inertial sensors 11, 12 are micro-electro-mechanical system (MEMS) sensors such as are well known in the art **(5:9-15)**.

Turning to the first sensor 11, the sensor has first and second output terminals 11a, 11b that are coupled to respective capacitive elements of the sensor. At rest, the capacitances at the terminals 11a and 11b are balanced, *i.e.*, substantially equal to each other, but when the device is subjected to acceleration in the X-axis, the capacitance of one terminal increases, while that of the other terminal decreases, producing a capacitive imbalance signal ΔC_X that corresponds in magnitude and polarity to the detected acceleration **(4:9-5:3)**.

It should be noted that acceleration is commonly referred to as positive or negative, depending upon which direction it occurs along a given axis. In other words, in response to an acceleration in a first –positive – direction along the X axis, the capacitive value at the first output 11a will increase in direct relation to the strength of the detected acceleration and the capacitive value at the second output 11b will decrease in direct relation to the strength of the detected acceleration, resulting in a positive difference between the two values, or ΔC_X. Conversely, in response to an acceleration in a second – negative – direction, opposite the first direction, along the X axis, the capacitive value at the first output 11a will *decrease* in direct relation to the strength of the detected acceleration and the capacitive value at the second output 11b will *increase* in direct relation to the strength of the detected acceleration, resulting in a negative ΔC_X.

The transduction stage 14 includes a current-to-voltage converter 17, a low-pass filter 18, a subtract or node 19, and a rectifier 20 **(5:16-17)**. The converter 17 is coupled to the outputs 11a, 11b of the first inertial sensor 11, and produces a voltage signal at its output, which corresponds to the difference between the capacitive values, and therefore to the strength of a detected acceleration **(5:21-27)**. The filter 18 separates a continuous component from a dynamic component of the signal, passing the continuous component while blocking the dynamic component **(5:28-6:5)**. The continuous component, *i.e.*, the portion of the signal that corresponds to continuous accelerations such as gravity, is subtracted from the complete signal at

the subtract or node 19. In this way, the influence of gravity on the device is cancelled, and the signal A_{XD} that remains, at the output of the subtract or node 19, corresponds to the dynamic acceleration of the device **(6:6-11)**. The rectifier 20 produces a positive-value signal $|A_{XD}|$ at its output, regardless of the polarity of the signal from the subtract or node. Thus, the value of the signal $|A_{XD}|$ at the output 14a of the first transduction stage 14 is insensitive to the polarity of the acceleration, but instead corresponds to an absolute value of the dynamic component of the detected acceleration in the X axis **(6:12-15)**.

In response to acceleration along the Y-axis, the second inertial sensor 12 produces, at its terminals 12a, 12b, a capacitive imbalance ΔC_Y that corresponds in magnitude and polarity to the detected acceleration in the Y axis, which is processed by the second transduction stage 15 substantially identically to the processing of the signal ΔC_X of the first transduction stage 14, to produce a signal $|A_{YD}|$ at the output 15a of the second transduction stage 15, which corresponds to an absolute value of the dynamic component of the detected acceleration in the Y axis **(6:16-7:4)**.

The comparison stage 16 comprises first and second upper-threshold comparators 21, 22, first and second lower-threshold comparators 23, 24, and an output logic circuit 27, having a two-input AND gate 29 and a three-input OR gate 30 **(7:5-8)**. The output of the OR gate 30 forms the output 10a of the inertial detection circuit 10 **(7:21-22)**.

The signal $|A_{XD}|$ from the output 14a of the first transduction stage 14 is supplied to inputs of the first upper-threshold comparator 21 and the first lower-threshold comparator 23, while the signal $|A_{YD}|$ from the output 15a of the second transduction stage 15 is supplied to inputs of the second upper-threshold comparator 22 and the second lower-threshold comparator 24 **(7:9-15)**. Outputs of the first and second lower-threshold comparators 23, 24 are coupled to respective inputs 29a, 29b of the AND gate 29, and outputs of the first and second upper-threshold comparators 21, 22 and of the AND gate 29 are coupled to respective inputs 30a, 30b, 30c of the OR gate 30 **(7:15-22)**.

The first upper-threshold comparator 21 compares the signal $|A_{XD}|$ with a first upper threshold value X_H, and supplies an output signal SX_H at its output. If the signal $|A_{XD}|$ exceeds the first upper threshold value X_H, the output signal SX_H is set at a first – *e.g.*, high – logic value, while if the signal $|A_{XD}|$ does not exceed the first upper threshold value X_H, the

output signal SX_H is set at a second – *e.g.*, low – logic value **(7:23-8:2)**. Likewise, the second upper-threshold comparator 22 compares the signal $|A_{YD}|$ with a second upper threshold value Y_H, and supplies an output signal SY_H at its output, set at the first or second logic value, depending on whether or not the signal $|A_{YD}|$ exceeds the second upper threshold value Y_H **(8:3-10)**.

The first and second lower-threshold comparators 23, 24 process the respective signals $|A_{XD}|$ and $|A_{YD}|$ in a manner that is substantially similar to that described with reference to the first and second upper-threshold comparators 21, 22, comparing them to respective lower threshold values X_L and Y_L, and supplying output signals SX_L at SY_L at their respective outputs, each set at the first or second logic value according to whether or not the input signal exceeds the respective lower threshold value **(7:23-8:10)**.

The AND gate 29 supplies the first logic value at its output only if both the first and second lower-threshold comparators 23, 24 supply the first logic value at their respective outputs. Thus, the AND gate produces the first logic value only if both of the signals $|A_{XD}|$ and $|A_{YD}|$ exceed their respective lower thresholds. On the other hand, an output signal R of the OR gate 30 is set at the first logic value if any one of the inputs 30a, 30b, or 30c is set at the first logic value. Thus, the output signal R will be set at the first logic value at the output 10a of the inertial sensor circuit 10 if both of the signals $|A_{XD}|$ and $|A_{YD}|$ exceed their respective lower thresholds, or if either of the signals $|A_{XD}|$ and $|A_{YD}|$ exceed their respective upper thresholds **(7:14-25)**.

In summary: (1) if a detected acceleration in either direction along the X axis is greater than an upper X threshold, the output signal R at the output 10a of the inertial sensor circuit 10 will be set at the first logic value; (2) if a detected acceleration in either direction along the Y axis is greater than an upper Y threshold, the output signal R will be set at the first logic value; (3) if a detected acceleration in either direction along the X axis is greater than a lower X threshold, <u>and</u> a detected acceleration in either direction along the Y axis is greater than a lower Y threshold, the output signal R will be set at the first logic value; and (4) if none of the three previous conditions are met, the output signal R will be set at the second logic value **(7:14-25)**.

While a two-axis inertial detector circuit is discussed in some detail above, one of ordinary skill in the art will recognize that the disclosed principles can likewise be applied to a

three-axis inertial detection circuit, to provide a reactivation signal in response to movement of the device along three axes **(11:11-14)**.

According to another embodiment, only one transduction stage is provided, *e.g.*, the first transduction stage 14, and the signals from the first and second inertial sensors 11, 12 are sequentially coupled to the input of the transduction stage by, for example, a multiplexer, so that both the X and Y signals are processed by the same circuit. The corresponding signals $|A_{XD}|$ and $|A_{YD}|$ are temporarily stored in a registered so they can be simultaneously provided at the corresponding inputs of the comparison stage **(11:17-22)**.

D. Correlation of Claims to the Specification

Each independent claim that is involved in this appeal and each claim that includes a means plus function limitation is listed below, with the respective means plus function limitation identified by italic characters. Subject matter in the specification corresponding to each claimed limitation is set forth by page and line number, and where applicable, by figure and reference number. The figure numbers used below correlate to the numbering of the figures of the specification rather than to the figures submitted in the present brief. Thus, for example, a reference to Figure 4 in this correlation refers to Figure 4 of the original specification, which is reproduced above as Figure 2 of the present Brief.

1. A multidirectional inertial device having a plurality of preferential detection axes, comprising:

inertial sensor means, which are sensitive to accelerations parallel to said preferential detection axes **(5:9-15**; Figs. 3, 11, 12);

transduction means, coupled to said inertial sensor means and supplying a plurality of acceleration signals, each of which is correlated to an acceleration parallel to a respective one of said preferential detection axes **(5:16-7:4**; Figs. 3, 14, 15);

first comparison means, connected to said transduction means and supplying a first recognition signal when only a first of said acceleration signals is greater than a respective upper threshold and supplying the first recognition signal when only a second of said

acceleration signals is greater than a respective upper threshold (first and second upper threshold comparators 21, 22 and gates 30; Figs. 3, 21, 22, 30; **7:9-8:10**); and

second comparison means, connected to said transduction means and to said first comparison means for supplying said first recognition signal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold (first and second lower threshold comparators 23, 24, and gate 29 or gate 30; Figs. 3, 23, 24, 30; **7:9-8:10**); and

wherein the *first comparison means* supply the first recognition signal when an absolute value of a first one of said acceleration signals is greater than the respective upper threshold **(8:14-17)**, and when an absolute value of a second one of said acceleration signals is greater than the respective upper threshold **(8:14, 15, 18, 19)**, and the second comparison means supply the first recognition signal when the absolute value of any two of said acceleration signals are each greater than the respective lower thresholds **(8:14, 15, 20-24)**.

2. The device according to claim 1 wherein said first *comparison means* comprise, for each said preferential detection axis, a respective first comparator (Figs. 3, 21, 22), which receives the respective one of said upper thresholds and receives the respective one of said acceleration signals, and at least one first logic gate (Figs. 3, 30), connected to each first comparator.

3. The device according to claim 2 wherein *said second comparison means* comprise, for each of said preferential detection axes, a respective second comparator (Figs. 3, 23, 24), which receives the respective one of said lower thresholds and receives the respective one of said acceleration signals, and at least one second logic gate (Figs., 3 29), connected to each second comparator.

6. The device according to claim 1 wherein said *inertial sensor means* comprise at least one micro-electro-mechanical sensor with capacitive unbalancing (Figs. 2, 10; Figs. 3, 11, 12; **1:10-12, 5:9-11**).

7. The device according to claim 6 wherein said *inertial sensor means* comprise a micro-electro-mechanical capacitive-unbalance sensor for each of said preferential detection axes (Figs. 3, 10, 11; **5:4-15**).

8. The device according to claim 6 wherein said *transduction means* comprise:

at least one current-to-voltage converter, connectable to said at least one micro-electro-mechanical sensor (Figs. 3, 14; **5:18-21**);

a subtract or node, having an inverting input and a non-inverting input, the non-inverting input connected to an output of said current-to-voltage converter (Figs. 3, 19; **5:26-27**);

a filter, connected between said output of said current-to-voltage converter and said inverting input of said subtract or node (Figs. 3, 18; **5:28-6:1**); and

a rectifier, which is connected to an output of said subtract or node and supplies at least one of said respective acceleration signals (Figs. 3, 20; **6:12-15**).

9. A portable electronic apparatus, comprising:

a device for reactivation from stand-by, said device including a multidirectional inertial device that includes:

an output terminal of the device for reactivation from standby;

inertial sensor means, which are sensitive to accelerations parallel to each of a plurality of preferential detection axes (Figs. 3, 11, 12; **5:9-15**);

transduction means, coupled to said inertial sensor means and supplying a plurality of acceleration signals, each of which is correlated to an absolute value of an acceleration parallel to a respective one of said preferential detection axes (Figs. 3, 14, 15; **5:16-7:4**);

first comparison means, connected to said transduction means and supplying a reactivation signal at the output terminal when only a first one of said acceleration signals is greater than a respective upper threshold, and supplying the reactivation signal at the output terminal when only a second one of said acceleration signals is greater than a respective upper threshold; and

second comparison means, connected to said transduction means and to said first comparison means for supplying said reactivation signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold.

10. A method for detecting the state of motion of a device, comprising:

generating a plurality of acceleration signals, each of which is correlated to an absolute value of an acceleration parallel to a respective preferential detection axis **(6:14, 15; 7:3, 4)**;

supplying a first recognition signal at an output terminal when only a first one of said acceleration signals is greater than a respective upper threshold **(8:14-17)**;

supplying the first recognition signal at the output terminal when only a second one of said acceleration signals is greater than a respective upper threshold **(8:14, 15, 18, 19)**; and

supplying the first recognition signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold **(8:14, 15, 20-24)**.

13. A device, comprising:

a portable electronic apparatus (Figs. 5, 30) configured to go into stand-by after a period of inactivity and to return to an active state when a first recognition signal (R) is produced at an output terminal (Fig. 5, 10a; **10:10-16)**, including:

an acceleration circuit configured to produce a dynamic acceleration signal corresponding to a level of acceleration in each of a plurality of detection axes (Figs. 3, 11, 12, 14, 15);

a comparator circuit for each of the detection axes, configured to compare the respective dynamic acceleration signal with respective higher and lower threshold signals (Figs. 3, 21, 22, 23, 24); and

a logic circuit configured to produce a first recognition signal at the output terminal if the dynamic acceleration signal of only a first one of the plurality of detection axes

exceeds its respective higher threshold, if the dynamic acceleration signal of only a second one of the plurality of detection axes exceeds its respective higher threshold, and if the dynamic acceleration signals of any two of the plurality of detection axes exceed their respective lower thresholds (Figs. 3, 27, 29, 30).

21. A method, comprising:

sensing acceleration of a device in each of a plurality of axes (**5:9-15**);

comparing respective levels of the acceleration in the axes with a high threshold (**9:10-12**);

comparing the respective levels of the acceleration in the axes with a low threshold (**9:10-12**);

producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold (**8:14-17**; **9:12-14**);

producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold (**8:14, 15, 18, 19**; **9:12-14**);

producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold (**8:14, 15, 20-24**; **9:14-16**);

deactivating a device to a stand-by status in response to a period of inactivity of the device (**10:10-12**); and

reactivating the device from the stand-by status when the recognition signal is produced (**10-12-16**).

28. A device, comprising:

an acceleration circuit configured to produce a dynamic acceleration signal corresponding to a level of acceleration in each of a plurality of detection axes (Figs. 3, 11, 12, 14, 15);

a comparator circuit for each of the detection axes, configured to compare the respective dynamic acceleration signal with respective higher and lower threshold signals (Figs. 3, 21, 22, 23, 24); and

a logic circuit configured to produce a first recognition signal at an output terminal if the dynamic acceleration signal of only a first one of the plurality of detection axes exceeds its respective higher threshold, if the dynamic acceleration signal of only a second one of the plurality of detection axes exceeds its respective higher threshold, and if the dynamic acceleration signals of any two of the plurality of detection axes exceed their respective lower thresholds (Figs. 3, 27); and

wherein the comparator circuit for each of the detection axes is configured to compare an absolute value of the respective dynamic acceleration signal with the respective higher and lower threshold signal (**7:25-8:10**).

29. A method, comprising:

sensing acceleration of a device in each of a plurality of axes (**5:4-15**);

comparing respective levels of the acceleration in the axes with a high threshold (**7:25-28**; **8:5-8**);

comparing the respective levels of the acceleration in the axes with a low threshold;

producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold (**8:14-17**);

producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold (**8:14, 15, 18, 19**);

producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold (**8:14, 15, 20-24**); and

wherein:

the step of producing the first recognition signal if the level of the acceleration with respect to any of the plurality of axes exceeds the high threshold comprises producing the first recognition signal if an absolute value of the level of the acceleration with respect to any one of the plurality of axes exceeds the high threshold (**8:14-19**); and

the step of producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold comprises

producing the first recognition signal if an absolute value of the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold **(8:14, 15, 20-24)**.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1-5, 9-15, 17, 18, 21-24, and 28-31 are unpatentable under 35 U.S.C. § 103(a) over Woehrl et al. (U.S. 5,173,614, hereafter *Woehrl*).

2. Whether claims 6-8 and 16 are unpatentable under 35 U.S.C. §103(a) over Woehrl, in view of Oguchi (U.S. Pub. 2002/0033047).

3. Whether claims 19 and 20 are unpatentable under 35 U.S.C. §103(a) over Woehrl, in view of Ishiyama (U.S. Patent 6,738,214).

Notes:

In the Final Rejection mailed October 16, 2008,[4] claims 1-31 and 33 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which the applicant regards as his invention. In the response filed February 17, 2009,[5] which was not entered, Appellants presented arguments for the allowability of claims 1-31 and 33 under 35 U.S.C. § 112. In the First Advisory Action, the Examiner stated that "Applicants' arguments regarding the § 112(2) [rejections] of the claims are persuasive." (*First Advisory Action*, page 2.) Accordingly, the rejections under § 112 are assumed by the Appellants to be withdrawn, and will therefore not be argued in the present brief. Appellants reserve the right to argue the issue in a reply brief if the Examiner renews or reaffirms the rejections under § 112 in an answer to this brief.

VII. ARGUMENT

As discussed in detail above, the preferred embodiment of the invention is directed to a device and method for use with a portable electronic apparatus, to bring the apparatus out of a standby condition into full operation when the device is moved. Over the course of the prosecution of the application, the Examiner has cited four primary references[6] and

[4] Hereafter, *Final Rejection*.

[5] Hereafter, *First Response AF* (after final).

[6] Woehrl, et al. (U.S. 5,173,614), Blank, et al. (U.S. 6,274,948), Jeenicke, et al. (U.S. 5,788,273), and Kiribayashi, et al. (5,995,892).

two secondary references[7] to support rejection of the claims. Of the six references relied upon at various times, none are directed to devices, circuits, methods, or systems for providing reactivation signals for activating a device from standby, or to portable electronic devices that include such devices or circuits, nor, as far as Appellants can determine, do any of the six references make even a minor reference or allusion to reactivating a portable electronic device from standby. All of the primary references relied upon are directed to systems or circuits for triggering airbags in vehicles. The secondary references are directed to MEMS sensors (Oguchi), and computer hard drives (Ishiyama).

In the Final Rejection, the Examiner relies almost entirely on Woehrl to support the claim rejections, citing Ishiyama and Oguchi as teaching limitations of only five of the 28 pending claims, all of them dependent claims. Woehrl is directed to a mechanism that provides a trigger signal for deployment of a vehicle's airbags. Woehrl's circuit includes a complex array of sensors, filters, switches, logic, etc., so as to distinguish the specific and narrow range of impacts that justify deployment of airbags from all of the other usual and unusual bumps and jolts that a typical vehicle undergoes. In order to adequately evaluate the appropriateness of the rejections, a thorough understanding of specific portions of Woehrl's system is necessary. Accordingly, prior to addressing the specific rejections, Woehrl will be discussed at some length in order to place its teachings in context with respect to the claimed inventions.

A. Discussion of prior art references.

Provided hereafter are brief discussions of the references relied upon by the Examiner in rejecting the claims under 35 U.S.C. §103.

1. U.S. Patent No. 5,173,614 to Woehrl

Woehrl is directed to an apparatus for triggering safety devices in vehicles, such as airbag devices,[8] and in particular, to an apparatus that can distinguish between different types of impacts including frontal impacts, lateral impacts, angular impacts, and rear impacts, as well as relatively small impacts,"[9] and provide a "trigger signal generating circuit which triggers or

[7] Oguchi (U.S. Pub. 2002/0033047) and Ishiyama (U.S. Patent 6,738,214).

[8] See, e.g., *Woehrl*, abstract and 1:7-10 – in the discussions and arguments that follow, when a specific passage of a U.S. patent is cited, it will be indicated by a column number separated from a line number by a colon.

[9] *Id.*, 1:54-57

activates the safety device [of a vehicle]when it is assured that a frontal impact has occurred[, such that] rear impacts do not cause the deployment of an air safety bag, for example."[10]

Figure 4, below, shows portions of Woehrl's Figures 2A and 2B, in which Woehrl's disclosed triggering circuit is shown, diagrammatically. To simplify the discussion related to the Woehrl reference, Figures 2A and 2B have been merged into a single drawing that includes elements relied upon by the Examiner in rejecting most of the claims. In particular, all of the elements in the signal paths that provide the inputs of the OR-gate 44 are shown, as well as the portion of the logic circuit to which the output signal of the OR-gate 44 contributes. Extraneous elements have been omitted, and the resulting drawing has been shortened by shortening connecting lines between many of the elements. While much of the original drawing has been omitted, the elements that remain are arranged and connected exactly as shown and described by Woehrl.

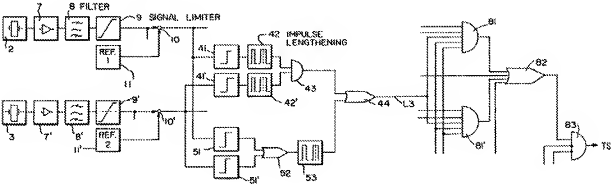

Figure 4
(from Woehrl's Figures 2A and 2B)

The portion of the circuit shown in Figure 4 includes directional impact sensors 2, 3 that are mounted in a vehicle, with their respective sensing axes orthogonal to each other and at a 45 degree angle with respect to the longitudinal axis of the vehicle.[11] Acceleration signals from the sensors 2, 3 are amplified and filtered via respective amplifiers 7, 7' and filters 8, 8'. Signal limiters 9, 9' limit the positive and negative amplitudes of the acceleration signals to

[10] *Id.*, 2:20-25.

[11] *Id.*, 4:52-62 and Figure 1.

selected values (*id.*, 5:9-15). Reference signals are generated by reference signal circuits 11, 11' and deducted from acceleration signals of the respective sensors by difference forming circuits 10, 10' (*id.*, 5:15-20). The signals, as modified by the difference forming circuits 10, 10' are supplied to threshold switches 41, 41', 51, 51', where they are compared to respective lower threshold values Sa4 at switches 41, 41' and respective higher threshold values Sa5 at switches 51, 51' (*id.*, 7:24-27, 9:28-32).

It should be noted that by deducting the reference signals from the acceleration signals at difference forming circuits 10, 10', only relatively strong positive acceleration signals will be presented to the threshold switches; weaker signals and negative signals are thus eliminated from consideration. Negative-value signals are evaluated via a different portion of the circuit, which will be discussed later.

Outputs of the threshold switches 41, 41' are coupled to inputs of an AND gate 43, while outputs of the threshold switches 51, 51' are coupled to inputs of an OR gate 52 (for the purposes of this discussion, the impulse lengthening circuits 42, 42', and 53 can be ignored), and outputs of the AND gate 43 and OR gate 52 are coupled to respective inputs of the OR gate 44 (*id.*, 7:30-40).

Each of the threshold switches 41, 41', 51, 51' is configured to produce a signal when its threshold value is exceeded by the respective acceleration signal. Accordingly, if the either of the two acceleration signals exceeds the high threshold values Sa5 of the threshold switches 51, 51', the OR gate 52 will produce a high signal at its output, which, in turn will produce a high signal at the output of the OR gate 44. If both acceleration signals exceed the low threshold values Sa4 of the threshold switches 41, 41', the AND gate 43 will produce a high signal at its input of the OR gate 44, which, again, will produce a high signal at the output of the OR gate 44 (*id.*, 9:26-32).

The output of the OR gate 44 is coupled to an input of each of two five-input AND gates 81, 81'. Outputs of the AND gates 81, 81' are coupled to inputs of an OR gate 82, the output of which is coupled to an AND gate 83 (*id.*, 8:44-59). The output of the AND gate 83, which constitutes the output of the trigger circuit, produces a trigger signal TS, which, when produced, activates vehicle airbags or the like.

It can be seen that a high signal from the OR gate 44 cannot, itself, provoke a trigger signal, except in combination with the appropriate signals at the other inputs of one the AND gates 81, 81', as well as at the other inputs of the AND gate 83. Nor is a high output signal from OR gate 44 essential to produce a trigger signal at the output of the trigger circuit, inasmuch as the OR gate 44 only contributes to two of the four inputs of OR gate 82. A signal at any one of the four inputs is sufficient, in combination with the appropriate signals at the other inputs of AND gate 83, to produce a trigger signal TS (*id.*, 10:10-15).

To assist in the discussion of Woehrl's treatment of negative signals, Figure 5 is provided, again derived from Woehrl's Figures 2A and 2B. As with Figure 4, the signal paths that are of interest are shown in their entirety, coupled exactly as shown and described by Woehrl, while most of the extraneous elements are omitted for clarity. The resulting drawing is again modified to the extent that connecting lines are shortened or lengthened to produce a diagram that is more compact and legible.

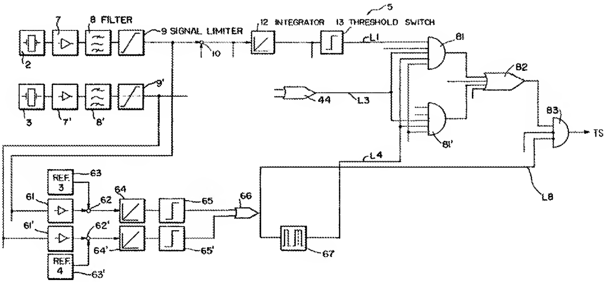

Figure 5
(from Woehrl's Figures 2A and 2B)

Referring now to Figure 5, a rear impact recognition circuit is shown, in which the acceleration signals from sensors 2, 3 are provided at inputs of inverting amplifiers 61, 61', which reverse the polarity of the respective signals so that the negative portions of the signals, *i.e.*, the signals produced by rear-impact accelerations, can be processed as positive-value

signals. Reference signals from reference signal circuits 63, 63' are deducted from the inverted signals at summing (difference forming) circuits 62, 62' just as described above with reference to Figure 4 (*id.*, 7:52-66). The resulting acceleration signals are provided at the inputs of respective integrating circuits 64, 64' and then to respective threshold switches 65, 65' (*id.*, 8:1-8).

The outputs of the threshold switches 65, 65' are coupled to respective inputs of an OR gate 66, whose output is coupled to inputs of the AND gates 81, 81', and 83 (*id.*, 8:8-18). It is important to note that the signal from the OR gate 66 is inverted at the inputs of each of the AND gates (*id.*, 8:57-59, 9:35-44). Thus, when a negative acceleration is detected by one of the threshold switches 65, 65', a low signal is produced on the conductors L4 and L8 and at the inputs of AND gates 81, 81', and 83, effectively blocking the production of a trigger signal TS (*id.*, 9:41-46). It can be seen that a trigger signal is produced in response to particular positive-value accelerations, but will never be produced in response to negative-value accelerations, regardless of strength or duration.

Figure 5 also shows a signal channel 5, including an integrator 12 that receives at its input the signal from the difference forming circuit 10 – the same signal that is supplied to the inputs of threshold switches 41 and 51, as discussed above with reference to Figure 4. The output of the integrator 12 is coupled to the input of a threshold switch 13. Signal channel 5 is not material to the claim rejections, [12] and does not influence the operation of the OR gate 44, but is shown in Figure 5 to clarify a passage of Woehrl that is cited by the Examiner. Woehrl describes the processing of the inverted signals via summing circuits 62, 62', integrating circuits 64, 64', and threshold switches 65, 65', beginning at 7:54, then states, at 8:5, that, "[t]hus, the signals for recognizing a rear impact are processed substantially in the same manner as in the signal channels 5 and 6." (Signal channel 6 is not shown in Figure 5, but is substantially identical to signal channel 5.[13]) By comparing the elements of the rear impact recognition circuit with those of signal channel 5, it can be seen that each of the channels of the rear impact recognition circuit bears a clear similarity with signal channel 5, but less similarity with the signal paths discussed with reference to Figure 4.

[12] Operation of the signal channel 6 is described by Woehrl at 5:6, *et seq.*

[13] See *id.*, 5:6-8.

Other components of Woehrl's system will not be reviewed in detail. It is sufficient to note that each of the separate inputs to AND gates 81, 81', and 83 is provided to supply a signal that enables or blocks production of a trigger signal TS under specific conditions. This enables Woehrl to "distinguish a frontal impact from a lateral impact and from a rear impact as well as from other short duration minor impacts such as a hammer blow in a repair shop," and to trigger deployment of, e.g., a vehicle airbag only when the direction, magnitude, and duration of an impact meet selected criteria.[14]

2. U.S. Pub. 2002/0033047 by Oguchi

Oguchi is directed to a micro-electro-mechanical sensor, and in particular to the structure of such a sensor, which is resistant to locking up and becoming inoperable when subjected to an excessive impact (*Oguchi*, abstract).

3. U.S. Patent No. 6,738,214, to Ishiyama

Ishiyama is directed to a computer disk drive that includes a mechanism for detecting "static acceleration" that indicates that the device has been dropped, and for retracting the read/write head of the disk drive before the "dynamic acceleration" that occurs when the device strikes a surface in a fall.

B. Case Law of General Relevance

The Examiner initially bears the burden of establishing a *prima facie* case of obviousness. *In re Bell*, 26 U.S.P.Q.2d 1529 (Fed. Cir. 1993); *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (1984); MPEP § 2142. Under 35 U.S.C. §103, an Examiner must ask whether the improvement is more than the predictable use of prior art elements according to their established functions." *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740, 82 U.S.P.Q.2d 1385 (2007). An Applicant may attack an obviousness rejection by showing that the Examiner has failed to properly establish a *prima facie* case or by presenting evidence tending to support a conclusion of non-obviousness. *In re Fritch*, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780 (1992). "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior

[14] *See*, e.g., *id.*, at 2:7-43.

art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303 (1983). "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP § 2141.02, citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (1983).

C. Rejection of claims 1-5, 9-15, 17, 18, 21-24, and 28-31 under 35 U.S.C. §103(a) over Woehrl.

1. Claims 1-5

Claim 1 recites, in part, "[a] multidirectional inertial device ..., comprising: ... first comparison means, ... supplying a first recognition signal when only a first of said acceleration signals is greater than a respective upper threshold ...; and second comparison means ... for supplying said first recognition signal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold; and wherein the first comparison means supply the first recognition signal when an absolute value of a first one of said acceleration signals is greater than the respective upper threshold, and when an absolute value of a second one of said acceleration signals is greater than the respective upper threshold, and the second comparison means supply the first recognition signal when the absolute value of any two of said acceleration signals are each greater than the respective lower thresholds.

Woehrl fails to teach or suggest all of the limitations of claim 1. In particular, Woehrl fails to teach or suggest supplying a first recognition signal when an absolute value of the recited acceleration signals is greater than the recited thresholds, as set forth in the claim. Woehrl is directed to triggering an airbag circuit, and is specifically configured to differentiate between positive and negative acceleration signals, in order to prevent triggering the airbags in response to a rear-impact collision, for example.[15] Woehrl cannot supply recognition signals in response to the absolute value of acceleration while also differentiating between positive and negative acceleration.

[15] Woehrl 2:16-25

The Examiner points to Woehrl's signal paths extending from the impact sensors 2, 3, through threshold switches 41, 41', 51, and 51', and terminating at the OR gate 44, as corresponding to the sensor means, transduction means, and first and second comparison means of claim 1, and points to the signal produced at the output of Woehrl's OR gate 44 as corresponding to the recognition signal supplied by the first and second comparison means of claim 1.[16] In rejecting the limitations reciting the comparison of absolute values of the acceleration signals with the upper and lower thresholds,[17] the Examiner states, merely, that "Woehrl discloses that in forward impacts, the absolute values of the acceleration signals are compared to first and second thresholds …."[18]

In a previous response, Appellants reviewed the meaning of *absolute value*, as the term would be understood by one of ordinary skill, and argued that the Examiner's statement "is substantially the same as arguing 'the absolute values of all positive signals are compared to first and second thresholds.' The fact that the signals from forward impacts are positive, and therefore are considered in the comparison process is not the same as comparing an absolute value of a signal. If an acceleration signal is filtered to remove a negative component, or is compared against a positive threshold, only, in a way that eliminates not only the positive signals that are below the threshold, but also <u>all</u> negative signals (as in the case of Woehrl), such a process does not make a comparison based on an absolute value of the signal. In a process in which the absolute value of a signal is compared, a negative value of a given magnitude will be treated identically with a positive value of the same magnitude."[19]

In response to Appellants' previous arguments, The Examiner argued that "Woehrl discloses a rear impact circuit in which the negative acceleration values are converted to positive values …. these converted absolute values are processed in circuitry similar to that used for forward impacts (col. 8, lines 5-8)."[20] Applicants disagree for at least three reasons. First, the citation to the passage at 8:5-8 of Woehrl is inapposite, as demonstrated above in the

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[16] *Final Rejection*, pages 6 and 7.

[17] These limitations were previously recited in claim 25.

[18] *Final Rejection*, page 10, fourth full paragraph.

[19] First Response AF, page 18, first full paragraph.

[20] *First Advisory Action*, page 2, third paragraph.

discussion of the Woehrl reference,[21] inasmuch as the similarity mentioned in the cited passage is with respect to the signal channel 5 – which is not the portion relied upon by the Examiner in rejecting the claims – rather than the signal paths to the OR gate 44. Furthermore, Woehrl's statement is clearly with reference to the processing of the respective signals as far as the threshold switches, because, thereafter, there is no correlation between the processing in the logic portion of the trigger circuit of the positive signals of signal channels 5, 6 and of the negative signals of the rear impact recognition circuit. The fact that the separate paths initially follow similar steps is irrelevant if they don't ultimately conform to the limitations of the claim.

Second, the negative signals are explicitly processed in circuitry that is structurally different in order to obtain a different result, i.e., to "prevent the activation of the safety device in response to a rear impact."[22] If Woehrl produced a first recognition signal at the output of OR gate 44 in response to comparisons of the absolute values of the acceleration signals, the OR gate would be entirely insensitive to the polarity of a signal, but would respond to positive or negative polarity signals of equal magnitude identically, which it does not. In fact, the output of the OR gate responds only to positive signals. As previously noted, a trigger signal can only be provoked in Woehrl's device by one or more <u>positive</u> acceleration signals exceeding specified magnitude and duration criteria.

Finally, assuming it was acceptable to provide different portions of a "first recognition signal" at different terminals of the circuit in response to positive and negative polarity signals, it would still be necessary to show that acceleration signals of equal magnitude and opposite polarity produced identical responses at their respective outputs, in order to support a position that the output of the circuit is produced in response to an absolute value of the acceleration signals. Woehrl cannot support even this position. For example, there is no treatment of the negative signals that corresponds to the operation of the threshold switches 41, 41' and the AND gate 43 on the positive side of the circuit. Thus, at the very least, Woehrl fails to teach or suggest a "second comparison means … for supplying said first recognition signal when [the absolute values of] any two of said acceleration signals are each greater than a

[21] Page 22, supra.

[22] *Woehrl*, 7:52-54.

respective lower threshold." This limitation is only met with respect to the positive-value signals, not to the absolute value of both positive and negative value signals. Accordingly, claim 1 is allowable over Woehrl, together with dependent claims 2-5.

2. Claim 31

Claim 31, which depends from claim 1, recites, "an output terminal of the multidirectional inertial device, and wherein the first and second comparison means are each configured to supply the first recognition signal at the output terminal." Woerhl fails to teach or suggest this limitation, because the trigger signal produced at its output terminal is specifically tailored to be in response to forward impact signals only, and so cannot be in response to comparisons of absolute-value signals.

In rejecting claim 31, the Examiner argues that "it would be obvious to label the output of logic gate (44) [as] the output of the inertial device."[23] While Appellants disagree with this argument, it is irrelevant to the allowability of claim 31. The Examiner has admitted that the positive acceleration signals are processed via different circuitry than the negative acceleration signals,[24] a tacit admission that an output derived from negative acceleration signals is not supplied at the output of the OR gate 44. In fact, Woehrl's rear impact recognition circuit, which processes negative impact signals from the impact sensors as discussed above with reference to Figure 5,[25] has no effect on the output of the OR gate 44, which the Examiner has pointed to as corresponding to the output terminal of claim 31. Even if, as argued by the Examiner, Woehrl does produce a first recognition signal in response to comparisons of absolute values of acceleration signals, the portion of the signal corresponding to negative acceleration signals must be at a terminal other than the output terminal of OR gate 44. Claim 31 requires that the signals supplied by the first and second comparison means be supplied at the output terminal.

Even setting aside limitations related to absolute values of signals, the Examiner's statement is not persuasive.

[23] *Final Rejection*, page 10, penultimate paragraph.

[24] Supra.

[25] Page 22, supra.

While it may be true that the various components of Woehrl's triggering apparatus include respective output terminals, and each is part of the overall apparatus, one of ordinary skill would not label some or all of them as an "output" of the apparatus, per se, because of the significant confusion this would engender. Instead, each would be labeled according to the respective component, unless the output of the component also served as the overall device output, as in the case of Woehrl's AND gate 83.

For example, the output terminal of the logic gate 44 would be labeled, by one of ordinary skill in the art, as the output terminal of the logic gate 44, not as the output terminal of the overall device. Applicants note that had the Examiner not specifically referred to that terminal as "the output of logic gate (44)" in the Office Action,[26] it would have been impossible for a reader to know that the Examiner was referring to that specific connection terminal within the apparatus. For the same reason, as is very well known in the art, it is the accepted convention to label terminals according to the specific device that they serve. Thus, one of ordinary skill would recognize a reference to the "output terminal" of Woehrl's triggering apparatus as being directed to the terminal at which the trigger signal TS is supplied, just as the Examiner's reference to "'the output' of logic gate (44)" was recognized by the Applicants as being directed to the point where line L3 is coupled to logic gate 44, as shown in Figure 4, and not, for example, to any of the output terminals of the transistors that a logic gate such as gate 44 inherently comprises. To do otherwise would create considerable confusion, and could make it impossible to adequately describe or define even a moderately complex device. This is also consistent with Woehrl's use of the term. At 10:4-6, Woehrl refers to the conditions that will "provide the trigger signal TS at the output of the trigger circuit 15 for triggering the safety device." A review of the text from 9:44, forward makes it clear that the "output of the trigger circuit 15" is a reference to the output terminal of the AND gate 83.

Claim 31, including the limitations of base claim 1, recites a multidirectional inertial device that includes sensor means, transduction means, comparison means, etc. To the extent that Woehrl's circuit can be said to correspond to the elements of claim 31, the circuit must include all of the corresponding elements, from the impact sensors 2, 3 forward. No person

[26] *Final Rejection*, page 7, third paragraph.

having ordinary skill in the art would point to the output of the OR gate 44 as the output of such a device, but would instead point to the output of the trigger circuit, at AND gate 83, as the output of Woehrl's device. Thus, even if it were possible to show that the limitations of claim 1 were met by Woehrl's device, claim 31 would be allowable on its own merits.

In response to previous arguments, the Examiner states that claim 31 "does not positively recite that the output terminal is the connection to another device. The portable electronic device is not recited in … claim 31. One skilled in the art would understand that drawing boundaries on electrical circuits have no affect [*sic*] on their performance. It would be obvious to redraw the multidirectional inertial device such that the output terminal is the output of the logic gate 44. Regardless, applicants' admitted prior art states that it is known to supply a recognition signal to the output terminal of the device and to an electronic apparatus …."[27]

Appellants disagree with the Examiner's arguments. First, the claim is clear in reciting an output terminal of the multidirectional inertial device. One of ordinary skill in the art would understand the meaning of *output terminal* as it relates to the multidirectional inertial device recited in claims 1 and 31, so it is not necessary to recite additional structure. Second, what one of ordinary skill would understand about effect of drawing boundaries on a circuit diagram is irrelevant for exactly the reason stated by the Examiner: it would have no effect on the performance of the device. Redrawing the boundaries on the diagram would not change the fact that the actual output of the device is the output of the AND gate 83, not that of the OR gate 44. Finally, the admitted prior art, as it pertains to supplying a recognition signal to the output of a device, is also irrelevant, because the Examiner has not shown that one of ordinary skill would be motivated to provide the output of the OR gate 44 as the output of Woehlr's device.

The question turns on what one of ordinary skill would understand, with regard to the meaning of the term *output terminal*, as it is used in claim 31, and, separately, what modifications one of ordinary skill would be motivated to make to Woehlr in the absence of the framework of claims 1 and 31 as a guide. On the basis of the specification and claims of the present application, one of ordinary skill in the art would recognize that the output terminal of the circuit is the position from which an activation or recognition signal is provided.[28] It is well

[27] *First Advisory Action*, page 2, second paragraph.

[28] *See, e.g.*, *Specification*, **7:21, 22.**

understood in the art that when a circuit is designed, it is typically designed to be as simple as the designer can make it, within the constraints of desired functionality, reliability, etc. unnecessary components and structure are eliminated from the design to reduce cost and complexity. Thus, one of ordinary skill would also understand that other terminals, interior to the circuit, would not reliably serve as the circuit output if the user intends to use the circuit according to its intended function. Otherwise, the designer would have further simplified the circuit by eliminating superfluous elements between the nominal circuit output and the proposed interior contact point.

In the present case, if the output of Woehrl's OR gate 44 were capable of operating as the output terminal, within the intended function of the circuit, it would be possible to eliminate well over half the elements of the circuit. The very existence of those other elements would discourage one of ordinary skill from designating the output of the OR gate as the output of the device, because a competent circuit designer would have reduced the cost and improved the durability and reliability of the circuit by eliminating those extraneous elements, if they were not considered essential to the correct production of the trigger signal.

It is not merely a matter of redrawing boundaries on a circuit diagram. Woehlr is not directed to a circuit diagram, but to an actual, functioning circuit that is *represented* by the diagram. Woehlr proposes to employ this circuit to trigger vehicle safety devices under specific circumstances.[29] On the basis of Woehrl's teachings, one of ordinary skill would understand that the trigger signal for triggering deployment, e.g., of the vehicle airbags, is to be taken from the output of the circuit. The question, then, is whether one of ordinary skill in the art would be motivated, not merely to call it the output of the device, but to *use the signal* that is present at the output of the OR gate 44 as the trigger signal for deploying vehicle airbags, consistent with Woehrl's teachings. Appellants do not believe that such a person would be so motivated.

The recent Supreme Court case *KSR Intern. Co. v. Teleflex Inc.*[30] provides some guidance that is relevant to the present question, stating that " a court [or Examiner] must ask whether the improvement is more than the <u>predictable use</u> of prior art elements according to their <u>established functions</u>."[31] The predictable use of Woehlr's circuit is as a trigger circuit in a motor

[29] *Woehrl*, 2:1-25.

[30] 127 S.Ct. 1727, 1740, 82 U.S.P.Q.2d 1385 (2007).

[31] *Id.*, at 1740 (emphasis added).

vehicle safety system. Woehlr's established function is to "construct an impact sensor ... in such a way that it can reliably distinguish between different types of impacts including frontal impacts, lateral impacts, angular impacts, and rear impacts, as well as relatively small impacts,"[32] and provide a "trigger signal generating circuit which triggers or activates the safety device [of a vehicle]when it is assured that a frontal impact has occurred[, such that] rear impacts do not cause the deployment of an air safety bag, for example."[33] The Examiner does not argue that one of ordinary skill would be motivated to use Woehlr's circuit for anything other than as a vehicle safety trigger circuit, so the predictable-use prong is met, at least with respect to the rejection of claims 1 and 31, but the established-function prong is definitely not met by the proposed modification. If the signal from the OR gate 44 were used as the output of the device, to trigger a safety device, it would vastly reduce or entirely eliminate Woehlr's ability to reliably distinguish between different types of impacts, and would be incapable of blocking production of any trigger signal that meets the relatively broad criteria for producing a positive signal at the output of OR gate 44. Such a modification would effectively eliminate the function of all of the circuitry shown in Woehrl's Figures 2A and 2B except the portion shown in Figure 4 of the present brief, and would also eliminate the function of the logic gates shown to the right of the OR gate 44 in Figure 4. Clearly, a device modified as proposed by the Examiner would not operate according to the established function of Woehrl, and if it were used in the proposed form for something other than triggering vehicle airbags, it would not be a predictable use. The proposed modification would also change Woehlr's principal of operation, and would render Woehrl unsatisfactory for its intended purpose.[34] Accordingly, claim 31 is not *prima facie* obvious over Woehrl.

[32] Woehlr, 1:54-57

[33] *Id.*, 2:20-25.

[34] See, also, MPEP § 2143.01, subsections V ([if a] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification,) and VI ([i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious).

3. Claims 9, 23, and 24

Claim 9 recites, in part, "A portable electronic apparatus, comprising: a device for reactivation from stand-by, said device including a multidirectional inertial device that includes: an output terminal of the device for reactivation from standby; … transduction means … supplying a plurality of acceleration signals …; first comparison means … supplying a reactivation signal at the output terminal when only a first one of said acceleration signals is greater than a respective upper threshold …; and second comparison means … for supplying said reactivation signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold."

Woerhl fails to teach or suggest these limitations of claim 9. In particular, Woehrl fails to teach or suggest "means for supplying said reactivation signal at the output terminal." In rejecting claim 9, The Examiner points to Woehrl's signal paths extending from the impact sensors 2, 3 through threshold switches 41, 41', 51, and 51', and terminating at the OR gate 44, as corresponding to the transduction means and comparison means, etc. of claim 1, and points to the signal produced at the output of Woehrl's OR gate 44 as corresponding to the reactivation signal claim 9.[35] With regard to the limitation reciting an output terminal, the Examiner states that "the output is interpreted as the output of the OR gate (44). It is noted that claim 9 does not require supplying the reactivation signal to the electronic apparatus."[36]

It appears that the Examiner is arguing that the name of an element can be arbitrary, and does not affect the function of the device. Appellants disagree, at least with regard to the present case. If the matter were being considered under 35 U.S.C. §102, the argument would be more appropriate, because it would only be necessary to show an exactly corresponding structure. Under 35 U.S.C. §103, however, the understanding of the person having ordinary skill in the art is brought into the question. In that context, calling an element by a different name can imply, to the person of ordinary skill, corresponding structural changes. The person of ordinary skill in the art would not be motivated to designate components by randomly selected terms. Such a course would create very significant problems in communication, would greatly increase the likelihood of errors in assembly, and could easily make it impossible to produce or employ a circuit

[35] *Final Rejection*, pages 6 and 7.

[36] *Final Rejection*, page 7, third paragraph.

according to its intended design and function. If the output terminal of Woehrl's OR gate 44 were designated the output terminal of the overall device, one of ordinary skill would expect to be able to use it as such, without loss of function. Thus, the change in designation implies a change, either in the structure of the device, or in its functionality. As discussed in more detail above with reference to claim 31, the output of Woehrl's OR gate 44 cannot serve as the output of the device, according to its established function, but would instead change the device's principle of operation and render it unsuitable for its intended purpose. Accordingly, claim 9 is allowable over Woehrl, together with dependent claims 23 and 24.

4. Claims 10-12

Claim 10 recites, in part, "generating a plurality of acceleration signals, each of which is correlated to an **absolute value** of an acceleration parallel to a respective preferential detection axis; supplying a first recognition signal at an output terminal when only a first one of said acceleration signals is greater than a respective upper threshold; supplying the first recognition signal at the output terminal when only a second one of said acceleration signals is greater than a respective upper threshold; and supplying the first recognition signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold …."

Woehrl fails to teach or suggest these limitations of claim 10. As is well known in the art, the term "absolute value" refers to a value that is considered without reference to its polarity. Thus, for example, the sum of the absolute values of negative 2 and 3 is equal to the sum of the absolute values of 2 and negative 3: $|-2| + |3| = |2| + |-3|$.

Woehrl specifically distinguishes between positive and negative acceleration signals so as to "prevent the activation of the safety device in response to a rear impact (Woehrl, 7:52-54). This is accomplished, in part, by deducting a reference value Sa3 from the output of the signal limiters 9 (at summing circuit 10) before further processing the signals and providing results at the logic gate 44 (5:15-22 and 7:24-49, and Figures 2A, 2B). Deducting a value from the signals ensures that only relatively strong forward impacts can exceed the values of the threshold switches 41 and 51. One of ordinary skill in the art will recognize that no negative value signals, such as would result from a rear impact (see, e.g., 7:57-58), will be detected by

this device, and that the output of the logic gate 44, as well as that of the triggering device, is controlled to respond only to positive value signals.

The Examiner argues that "in forward impacts, the absolute value of the acceleration signals are compared to first and second thresholds." Applicants strongly disagree. This argument is substantially the same as arguing "the absolute values of all positive signals are compared to first and second thresholds." The fact that the signals from forward impacts are positive, and therefore are considered in the comparison process is not the same as comparing an absolute value of a signal. If an acceleration signal is filtered to remove a negative component, or is compared against a positive threshold, only, in a way that eliminates not only the positive signals that are below the threshold, but also <u>all</u> negative signals (as in the case of Woehrl), such a process does not make a comparison based on an absolute value of the signal. In a process in which the absolute value of a signal is compared, a negative value of a given magnitude will be treated identically with a positive value of the same magnitude. Woehrl does not do this, and therefore fails to teach or suggest all of the limitations of claim 10, which is thus allowable.

5. <u>Claims 13, 14, and 18</u>

Claim 13 recites, in part, "a portable electronic apparatus configured to go into stand-by after a period of inactivity and to return to an active state when a first recognition signal is produced at an output terminal, including: ... a logic circuit configured to produce a first recognition signal at the output terminal if the dynamic acceleration signal of only a first one of the plurality of detection axes exceeds its respective higher threshold, if the dynamic acceleration signal of only a second one of the plurality of detection axes exceeds its respective higher threshold, and if the dynamic acceleration signals of any two of the plurality of detection axes exceed their respective lower thresholds.

Woehrl fails to teach or suggest the limitations of claim 13. In particular, Woehrl fails to teach or suggest an output terminal that corresponds to the output terminal defined in claim 13, and as discussed in detail with respect to claims 31 and 10, above, and also fails to teach or suggest "a portable electronic apparatus configured to go into stand-by after a period of inactivity and to return to an active state when a first recognition signal is produced at [the] output terminal."

The Examiner states, in response to previous arguments, that the admitted prior art "discloses that it is known to supply a recognition signal to wake a portable electronic device from standby.... [A]pplicants' invention is not directed towards the act of actually sending a recognition signal – it is directed towards an apparatus to create the recognition signal in the first place. Woehrl discloses creating a recognition signal according to the pending claims."[37]

Appellants strongly disagree with the Examiner's arguments. First, whatever the admitted prior art discloses, the Examiner has only referred to the admitted prior art in responding to Appellants' arguments. The Examiner has not rejected any claims over the admitted prior art, or over a combination of references that includes the admitted prior art. Accordingly, the Examiner has not provided even the thinnest rationale to support the obviousness of such a combination, and has therefore deprived the appellants of the opportunity to rebut the combination. Thus, the fact that it is known to "supply a recognition signal to wake a portable electronic device from standby" can have no weight in a discussion of the allowability of the claims over the prior art that was actually relied upon to reject the claims.

Second, the invention is defined by the language of the claims, not by what the Examiner reads into the claims or into the specification. Questions regarding the scope of the invention are not properly addressable under § 103. Even if it were true that "the invention is not directed towards the act of actually sending a recognition signal," that has no bearing on its allowability under § 103. The Examiner has not cited any prior art as being properly combinable with Woehrl to show "a portable electronic apparatus configured to go into stand-by after a period of inactivity and to return to an active state when a first recognition signal is produced," as recited in the claim, and has therefore failed to demonstrate *prima facie* obviousness of claim 13, which is therefore allowable over Woehrl.

Finally, as discussed in detail above, Woehrl fails to produce a recognition signal, as defined in claim 13, at an output terminal. One of ordinary skill in the art would not find it obvious to return to a device to an active state on the basis of a signal at the output of Woehrl's OR gate 44. Accordingly, claim 13 is allowable, together with its dependant claims.

[37] First Advisory Action, page 2, fifth paragraph.

6. Claim 15

Woehrl fails to teach or suggest that "each of the transduction circuits is configured to subtract, from the respective acceleration value, a respective static acceleration value, thereby producing the respective dynamic acceleration signal," as recited in claim 15. In rejection claim 15, the Examiner points to Woehrl's summing junction 10 as corresponding to the recited limitation. However, this is not an appropriate rejection. As explained in the specification, *static acceleration* refers to constant acceleration forces, such as gravity.[38] By subtracting these forces, their effects on the response of the device are eliminated. Woehrl's summing junction 10 deducts a reference value from the acceleration signal.[39] There is no suggestion of any relationship between the reference value and a static acceleration, nor would it benefit from such. Woehrl is intended for operation in a vehicle, with sensing axes positioned to detect collisions with other vehicles, etc. Thus, the sensing axes are parallel to the ground, and therefore insensitive to the effects of gravity. Claim 15 is therefore allowable over Woehrl.

7. Claim 17

Woehrl fails to teach or suggest "a transduction circuit configured to receive from the sensor an acceleration value corresponding to a level of acceleration in each of the plurality of detection axes, sequentially, and to produce, for each detection axis, its respective dynamic acceleration signal," as recited in claim 17. The Examiner argues that "it would have been obvious to combine [Woehrl's] transduction circuits into one circuit that sequentially outputs the acceleration signals." Appellants disagree. According to claim 17, the single transduction circuit receives signals from each sensor *sequentially*. Whether Woehrl's transduction circuits are separate or combined is not important. The operation would remain unchanged. The signals from the two sensors would be processed in parallel, just as taught by Woehrl. There would be no reason to process them sequentially, because combing the circuits into a single circuit would not change their separate functions. To meet the limitation of claim 17, it would be necessary to *remove* one of Woehrl's transduction circuits, and operate the other sequentially, in order to

[38] *Specification*, **6:1-11.**

[39] *Woehrl*, 5:15-18

process both signal paths. Woehrl fails to teach or suggest such a modification. Claim 17 is therefore allowable.

8. Claims 21, 22, and 30

Claim 21 recites, in part, "producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold; producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold; producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold; deactivating a device to a stand-by status in response to a period of inactivity of the device; and reactivating the device from the stand-by status when the recognition signal is produced."

Woehrl fails to teach or suggest deactivating a device to a stand-by status in response to a period of inactivity of the device, and reactivating the device from the stand-by status when the recognition signal is produced. Woehrl is directed to triggering an airbag of a vehicle. If triggering the airbag is equivalent to "reactivating the device from the stand-by status," as recited in the claim, then in order to teach or suggest "deactivating a device to a stand-by status in response to a period of inactivity of the device" Woehrl would need to teach deactivating the airbag in response to a period of inactivity of the airbag, then reactivating the airbag. This is patently absurd. It is well known in the art that a vehicle airbag can only be triggered once, after which it must be replaced. Thus, an airbag cannot be re-activated, but only activated. Furthermore, once activated, it is not deactivated in response to a period of inactivity, but is instead deactivated simply because its combustive charge is exhausted, and does not go into a *standby status*, thereafter, but is fully discharged, and must be replaced. Thus, Woehrl fails to anticipate this limitation of claim 21. In rejecting claim 21, the Examiner is entirely silent with regard to these limitations, merely pointing to the rejection of claim 13, which is likewise silent regarding such limitations. Claim 21 is therefore allowable over Woehrl.

9. Claim 28

Claim 28 recites that "the comparator circuit for each of the detection axes is configured to compare an absolute value of the respective dynamic acceleration signal with the

respective higher and lower threshold signal." The scope of claim 28 differs from that of claim 1, but in view of the discussion related to comparing absolute values of acceleration signals, relative to claim 1, it is clear that claim is also allowable over Woehrl, which fails to teach or suggest "a comparator circuit ... configured to compare an absolute value of [a] dynamic acceleration signal," as recited in the claim.

10. Claims 29

As discussed in detail above with respect to similar limitations, Woehrl fails to teach or suggest "producing the first recognition signal if an absolute value of the level of the acceleration with respect to any one of the plurality of axes exceeds the high threshold; and ... producing the first recognition signal if an absolute value of the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold," as recited in claim 29.

D. Rejection of claims 6-8 and 16 under 35 U.S.C. §103(a) over Woehrl, in view of Oguchi.

1. Claims 6-7

Appellants believe that claims 6 and 7 are allowable as depending from an allowable base claim.

2. Claim 8

Claim 8 recites, in part, "a rectifier, which is connected to an output of said subtractor node and supplies at least one of said respective acceleration signals." In an embodiment disclosed in the specification, a rectifier serves to provide the absolute-value acceleration signal.[40] Woehrl does not employ such a device. The Examiner points to Woehrl's elements 9-11, 41, and 51. Element 9 is a signal limiter, 10 is a "summing or difference forming circuit," 11 is a reference signal circuit,[41] and 41 and 51 are both threshold switches.[42] None of these elements are, nor could they be interpreted as being, a rectifier. Woehrl is silent regarding such a device.

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[40] *Specification*, **6:12-15.**

[41] *Woehrl*, 5:12-20.

[42] *Woehrl*, 7:24-27.

3. Claim 16

Appellants believe that claim 16 is allowable as depending from an allowable base claim.

E. Rejection of claims 19 and 20 under 35 U.S.C. §103(a) over Woehrl, in view of Ishiyama.

1. Claim 19

Claim 19 recites that "the portable electronic apparatus is a cell phone." Neither Woehrl nor Ishiyama teach or suggest this limitation.

The Examiner argues that "it would have been obvious ... to combine the device with a cell phone ... because a cell phone is a small portable electronic device that may be dropped and is subject to internal component damage, similar to a portable computer."[43] Appellants disagree with the Examiner. Ishiyama is directed to a sensor circuit associated with a disk drive, which is configured to detect acceleration indicative of being dropped, and to retract the read/write head of the disk drive before the device strikes a surface in a fall.[44] Retracting the head before the device strikes a hard surface greatly reduces the likelihood that the hard drive would be damaged by the impact. At the time the present application was filed, cell phones were not known to include hard drives, nor were there other elements of a cell phone that could be instantly placed in a condition to better protect them from impact. Absent some reference that provides such a teaching, detecting a fall was moot. There would therefore have been no motivation to apply the teachings of Woehrl and Ishiyama to a cell phone.

2. Claim 20

Appellants believe that claim 20 is allowable as depending from an allowable base claim.

[43] *Final Rejection*, page 12, second full paragraph.

[44] *Ishiyama*, abstract.

F. Conclusion

In summary, Appellants submit that claims 1-24, and 28-31 are patentable over the art of record because the prior art references do not teach or suggest, either individually or in combination, all of the limitations of the respective claims. Appellants therefore respectfully request a speedy and favorable decision.

Respectfully submitted,
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VIII. CLAIMS APPENDIX

1. A multidirectional inertial device having a plurality of preferential detection axes, comprising:

inertial sensor means, which are sensitive to accelerations parallel to said preferential detection axes;

transduction means, coupled to said inertial sensor means and supplying a plurality of acceleration signals, each of which is correlated to an acceleration parallel to a respective one of said preferential detection axes;

first comparison means, connected to said transduction means and supplying a first recognition signal when only a first of said acceleration signals is greater than a respective upper threshold and supplying the first recognition signal when only a second of said acceleration signals is greater than a respective upper threshold; and

second comparison means, connected to said transduction means and to said first comparison means for supplying said first recognition signal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold; and

wherein the first comparison means supply the first recognition signal when an absolute value of a first one of said acceleration signals is greater than the respective upper threshold, and when an absolute value of a second one of said acceleration signals is greater than the respective upper threshold, and the second comparison means supply the first recognition signal when the absolute value of any two of said acceleration signals are each greater than the respective lower thresholds.

2. The device according to claim 1 wherein said first comparison means comprise, for each said preferential detection axis, a respective first comparator, which receives the respective one of said upper thresholds and receives the respective one of said acceleration signals, and at least one first logic gate, connected to each first comparator.

3. The device according to claim 2 wherein said second comparison means comprise, for each of said preferential detection axes, a respective second comparator, which receives the respective one of said lower thresholds and receives the respective one of said acceleration signals, and at least one second logic gate, connected to each second comparator.

4. The device according to claim 1 wherein said upper thresholds are equal to one another, and said lower thresholds are equal to one another.

5. The device according to claim 1 wherein the ratio between the upper threshold and the lower threshold corresponding to a same one of said preferential reference axes is substantially equal to $1/\sqrt{2}$.

6. The device according to claim 1 wherein said inertial sensor means comprise at least one micro-electro-mechanical sensor with capacitive unbalancing.

7. The device according to claim 6 wherein said inertial sensor means comprise a micro-electro-mechanical capacitive-unbalance sensor for each of said preferential detection axes.

8. The device according to claim 6 wherein said transduction means comprise:

at least one current-to-voltage converter, connectable to said at least one micro-electro-mechanical sensor;

a subtract or node, having an inverting input and a non-inverting input, the non-inverting input connected to an output of said current-to-voltage converter;

a filter, connected between said output of said current-to-voltage converter and said inverting input of said subtract or node; and

a rectifier, which is connected to an output of said subtract or node and supplies at least one of said respective acceleration signals.

9. A portable electronic apparatus, comprising:

a device for reactivation from stand-by, said device including a multidirectional inertial device that includes:

an output terminal of the device for reactivation from standby;

inertial sensor means, which are sensitive to accelerations parallel to each of a plurality of preferential detection axes;

transduction means, coupled to said inertial sensor means and supplying a plurality of acceleration signals, each of which is correlated to an absolute value of an acceleration parallel to a respective one of said preferential detection axes;

first comparison means, connected to said transduction means and supplying a reactivation signal at the output terminal when only a first one of said acceleration signals is greater than a respective upper threshold, and supplying the reactivation signal at the output terminal when only a second one of said acceleration signals is greater than a respective upper threshold; and

second comparison means, connected to said transduction means and to said first comparison means for supplying said reactivation signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold.

10. A method for detecting the state of motion of a device, comprising:

generating a plurality of acceleration signals, each of which is correlated to an absolute value of an acceleration parallel to a respective preferential detection axis;

supplying a first recognition signal at an output terminal when only a first one of said acceleration signals is greater than a respective upper threshold;

supplying the first recognition signal at the output terminal when only a second one of said acceleration signals is greater than a respective upper threshold; and

supplying the first recognition signal at the output terminal when any two of said acceleration signals are each greater than a respective lower threshold, which is smaller than the respective upper threshold.

11. The method according to claim 10 wherein said higher thresholds are equal to one another, and said lower thresholds are equal to one another.

12. The method according to claim 10 wherein the ratio between the upper threshold and the lower threshold corresponding to a same one of said preferential reference axes is substantially equal to $1/\sqrt{2}$.

13. A device, comprising:

a portable electronic apparatus configured to go into stand-by after a period of inactivity and to return to an active state when a first recognition signal is produced at an output terminal, including:

an acceleration circuit configured to produce a dynamic acceleration signal corresponding to a level of acceleration in each of a plurality of detection axes;

a comparator circuit for each of the detection axes, configured to compare the respective dynamic acceleration signal with respective higher and lower threshold signals; and

a logic circuit configured to produce a first recognition signal at the output terminal if the dynamic acceleration signal of only a first one of the plurality of detection axes exceeds its respective higher threshold, if the dynamic acceleration signal of only a second one of the plurality of detection axes exceeds its respective higher threshold, and if the dynamic acceleration signals of any two of the plurality of detection axes exceed their respective lower thresholds.

14. The device of claim 13 wherein the acceleration circuit comprises:

a sensor configured to sense acceleration in each of the detection axes; and

a transduction circuit for each of the detection axes, each transduction circuit configured to receive from the sensor an acceleration value corresponding to a level of acceleration in the respective one of the detection axes and to produce the respective dynamic acceleration signal.

15. The device of claim 14 wherein each of the transduction circuits is configured to subtract, from the respective acceleration value, a respective static acceleration value, thereby producing the respective dynamic acceleration signal.

16. The device of claim 14 wherein the sensor comprises a micro-electro-mechanical capacitive-unbalance sensor for each of the plurality of detection axes.

17. The device of claim 13 wherein the acceleration circuit comprises:

a sensor configured to sense acceleration in each of the detection axes; and

a transduction circuit configured to receive from the sensor an acceleration value corresponding to a level of acceleration in each of the plurality of detection axes, sequentially, and to produce, for each detection axis, its respective dynamic acceleration signal.

18. The device of claim 13 wherein the number of detection axes is two.

19. The device of claim 13 wherein the portable electronic apparatus is a cell phone.

20. The device of claim 13 wherein the portable electronic apparatus is a portable computer.

21. A method, comprising:

sensing acceleration of a device in each of a plurality of axes;

comparing respective levels of the acceleration in the axes with a high threshold;

comparing the respective levels of the acceleration in the axes with a low threshold;

producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold;

producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold;

producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold;

deactivating a device to a stand-by status in response to a period of inactivity of the device; and

reactivating the device from the stand-by status when the recognition signal is produced.

22. The method of claim 21 wherein each of the plurality of axes lies at right angles to each other.

23. The apparatus of claim 9 wherein each of the plurality of preferential detection axes are mutually orthogonal.

24. The apparatus of claim 9 wherein the plurality of preferential detection axes comprises first and second axes lying perpendicular to each other.

25-27. (Canceled)

28. A device, comprising:

an acceleration circuit configured to produce a dynamic acceleration signal corresponding to a level of acceleration in each of a plurality of detection axes;

a comparator circuit for each of the detection axes, configured to compare the respective dynamic acceleration signal with respective higher and lower threshold signals; and

a logic circuit configured to produce a first recognition signal at an output terminal if the dynamic acceleration signal of only a first one of the plurality of detection axes exceeds its respective higher threshold, if the dynamic acceleration signal of only a second one of the plurality of detection axes exceeds its respective higher threshold, and if the dynamic acceleration signals of any two of the plurality of detection axes exceed their respective lower thresholds; and

wherein the comparator circuit for each of the detection axes is configured to compare an absolute value of the respective dynamic acceleration signal with the respective higher and lower threshold signal.

29. A method, comprising:

sensing acceleration of a device in each of a plurality of axes;

comparing respective levels of the acceleration in the axes with a high threshold;

comparing the respective levels of the acceleration in the axes with a low threshold;

producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold;

producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold;

producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold; and

wherein:

the step of producing the first recognition signal if the level of the acceleration with respect to any of the plurality of axes exceeds the high threshold comprises producing the first recognition signal if an absolute value of the level of the acceleration with respect to any one of the plurality of axes exceeds the high threshold; and

the step of producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold comprises producing the first recognition signal if an absolute value of the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold.

30. The method of claim 21 wherein:

the step of producing a first recognition signal if the level of the acceleration with respect to only a first one of the plurality of axes exceeds the high threshold comprises producing the first recognition signal at an output terminal;

the step of producing the first recognition signal if the level of the acceleration with respect to only a second one of the plurality of axes exceeds the high threshold comprises producing the first recognition signal at the output terminal; and

the step of producing the first recognition signal if the level of the acceleration with respect to any two of the plurality of axes exceeds the low threshold comprises producing the first recognition signal at the output terminal.

31. The device of claim 1, comprising an output terminal of the multidirectional inertial device, and wherein the first and second comparison means are each configured to supply the first recognition signal at the output terminal.

32-33. (Canceled)

IX. EVIDENCE APPENDIX

There are no evidence appendices.

X. <u>RELATED PROCEEDINGS APPENDIX</u>

There are no related proceedings appendices.